Forces and Motion

5-5 The student will demonstrate an understanding of the nature of force and motion. (Physical Science)

5-5.2 Summarize the motion of an object in terms of position, direction, and speed.
Taxonomy level: 2.4-B Understand Conceptual Knowledge

Previous/Future knowledge: In 1st grade, students identified the location of an object relative to another object (1-5.1) and illustrated ways in which objects can move in terms of direction and speed (including straight forward, back and forth, fast or slow, zigzag, and circular) (1-5.4). In 3rd grade, students identified the position of an object relative to a reference point using position terms and a distance scale or measurement (3-5.1) and compared the motion of common objects in terms of speed and direction (3-5.2). Students will further develop these concepts in 8th grade (8-5.2) where they will develop the concept of speed quantitatively.

It is essential for students to know that motion is described in terms of position, direction, and speed as follows:

Position

- The *position* of an object is its location relative to another object (the reference point) for example "above", "below", "beside", "behind", "ahead of" plus the distance from the other object.
- The distance (length) from the reference point changes when the object moves.

Direction

- *Direction* of motion is the course or path that an object is moving and can be determined by reading a compass using the terms "north", "south", "east", or "west."
- Direction can also be described using the terms "right", or "left," "forward," or "toward" relative to another object, or "up", or "down" relative to Earth.

Speed

- A measure of how fast an object is moving.

NOTE TO TEACHER: Students should be able to measure the distance specific objects move in a given time. They can compare the relative speeds of different moving objects determining which is moving faster or slower.

It is not essential for students to know the concept of velocity (both speed and direction), or the concept of acceleration (changing speed). Students do not need to calculate speed.

Assessment Guidelines:
The objective of this indicator is to *summarize* the motion of an object in terms of position, direction, and speed; therefore, the primary focus of assessment should be to generalize major points about motion relative to position, direction, and speed. However, appropriate assessments should require students to *identify* the terms of position, direction, and speed and use them to describe motion; *illustrate* motion in terms of position, direction, and speed using drawings, diagrams, and word descriptions; or *interpret* a diagram of an object changing position over time in order to determine the speed of the object.